

*ON THE ROLE OF PREFERENCE IN  
RESPONSE COMPETITION*

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A duration-based preference assessment identified items that matched and did not match the sensory consequences hypothesized to maintain stereotypy. When evaluated in treatment, these items effectively competed with the occurrence of stereotypy, regardless of their sensory properties. It is suggested that relative preference, as measured in duration-based assessment, can be as significant as type of stimulation produced in interventions that reduce automatically reinforced problem behavior.

DESCRIPTORS: autism, automatic reinforcement, preference assessment, response competition

Functional analyses often produce outcomes that associate the highest levels of problem behavior with conditions of low environmental stimulation or across all conditions (Iwata et al., 1994). When clear functional analysis results are not obtained, it is often presumed that problem behavior is maintained by the intrinsic consequences of behavior (i.e., automatic reinforcement). A distinct line of research on assessing and treating automatically reinforced problem behavior has evolved to identify the intrinsic consequences that maintain these behaviors and to identify stimuli that effectively compete (i.e., produce high levels of engagement and low levels of problem behavior) with the problem behavior.

Piazza and colleagues (Piazza, Adelinis, Hanley, Goh, & Delia, 2000; Piazza et al., 1998) have demonstrated that identifying alternative forms of sensory stimulation via duration-based preference assessments can produce substantial decreases in the occurrence of automatically reinforced behavior (e.g., pica, saliva

play) during subsequent treatment. In this research, providing continuous access to items that produce sensory stimulation similar to that generated by engaging in the problem behavior (i.e., matched items) has been compared to the provision of items that produce different sensory consequences (i.e., unmatched items). In most cases, matched items consistently produced lower levels of problem behavior than unmatched items. Piazza et al. suggested that decreases in problem behavior in these cases were due to a response bias (i.e., preference) for the form of sensory stimulation that maintained problem behavior relative to alternative sources of stimulation. However, 2 of the participants in the 1998 investigation also displayed low levels of pica with unmatched stimuli. Given these results, the current study further evaluated the effects of matched and unmatched stimuli in the treatment of two common forms of stereotypic behavior.

## METHOD

Tim, a 13-year-old boy who had been diagnosed with autism and profound mental retardation, exhibited persistent and interfering gross motor stereotypy (body rocking and head weaving). Cris was 11 years old and had been diagnosed with autism and severe mental retardation.

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Cris exhibited frequent and interfering vocal stereotypy (noncontextual vocalizations, such as repetitive grunts and squeals). Prior functional analyses for both participants suggested that their stereotypic behavior was maintained by automatic reinforcement (i.e., an undifferentiated pattern of responding was observed across test conditions and responding persisted throughout a series of alone sessions; Vollmer, Marcus, Ringdahl, & Roane, 1995). It was hypothesized that vestibular stimulation maintained Tim's gross motor stereotypy and that auditory stimulation maintained Cris's vocal stereotypy.

Duration-based preference assessments were conducted in a manner described by Piazza *et al.* (1998). Stereotypy and item engagement, which was defined as participation in an activity in a manner consistent with its intended function (e.g., manipulating blocks with hands, rolling or bouncing on a therapy ball, eyes oriented in the direction of a book or television screen), were measured using 10-s momentary time sampling. Continuous access was provided to a single item for 8 min. Any item that was engaged with in at least 75% of intervals during the duration-based preference assessment was considered to be high preference.

A multielement design was used to compare baseline levels of stereotypy to a condition in which the participants had continuous access to a high-preference item that was presumed to match (large therapy ball for Tim; a videotape for Cris) or not match (blocks for Tim; books for Cris) the stimulation produced by stereotypy. During baseline, a therapist was in the room with the child and there were no programmed differential consequences for the occurrence of stereotypy. The matched condition was identical to baseline, with the exception that continuous access to a highly preferred matched item was provided. The unmatched sessions were identical to baseline, with the exception that continuous access to a highly preferred unmatched item was provided. All sessions were 8 min long.

Interobserver agreement was calculated for at least 33% of all session types for each participant (range, 33% to 100%) by having independent observers score videotapes of sessions. An agreement consisted of both observers scoring either the occurrence or non-occurrence of stereotypy and engagement. The number of intervals with agreements were divided by the number of intervals with agreements plus disagreements and multiplied by 100%. Mean agreement scores across session types averaged 93% (range, 87% to 100%) for stereotypy and 91% (range, 86% to 98%) for engagement.

## RESULTS AND DISCUSSION

The results of the duration-based preference assessment were used to determine which items to include in the multielement comparison. The ball and the blocks were the only items that produced both high levels of engagement and relatively low levels of stereotypy for Tim (Figure 1). Tim rolled and bounced on the therapy ball when engaged with this item, seemingly producing stimulation similar to that produced by his gross motor stereotypy (i.e., matched stimulation). Blocks were presented in a bin, and Tim played with them by sitting on the floor and manipulating them with his hands, seemingly producing stimulation different from that produced by engaging in gross motor stereotypy (i.e., unmatched stimulation). For Cris, several items that produced auditory stimulation (with the exception of the radio, which Cris turned off) were correlated with high levels of engagement and lower levels of vocal stereotypy (Figure 1). The video was a children's show that involved music and many novel noises (i.e., matched stimulation). Cris watched the video and occasionally clapped his hands and bounced up and down. Books were the only nonauditory stimulus correlated with a high level of engagement and low level of vocal stereotypy (Cris did not read the book aloud; thus, it was unmatched stimulation).

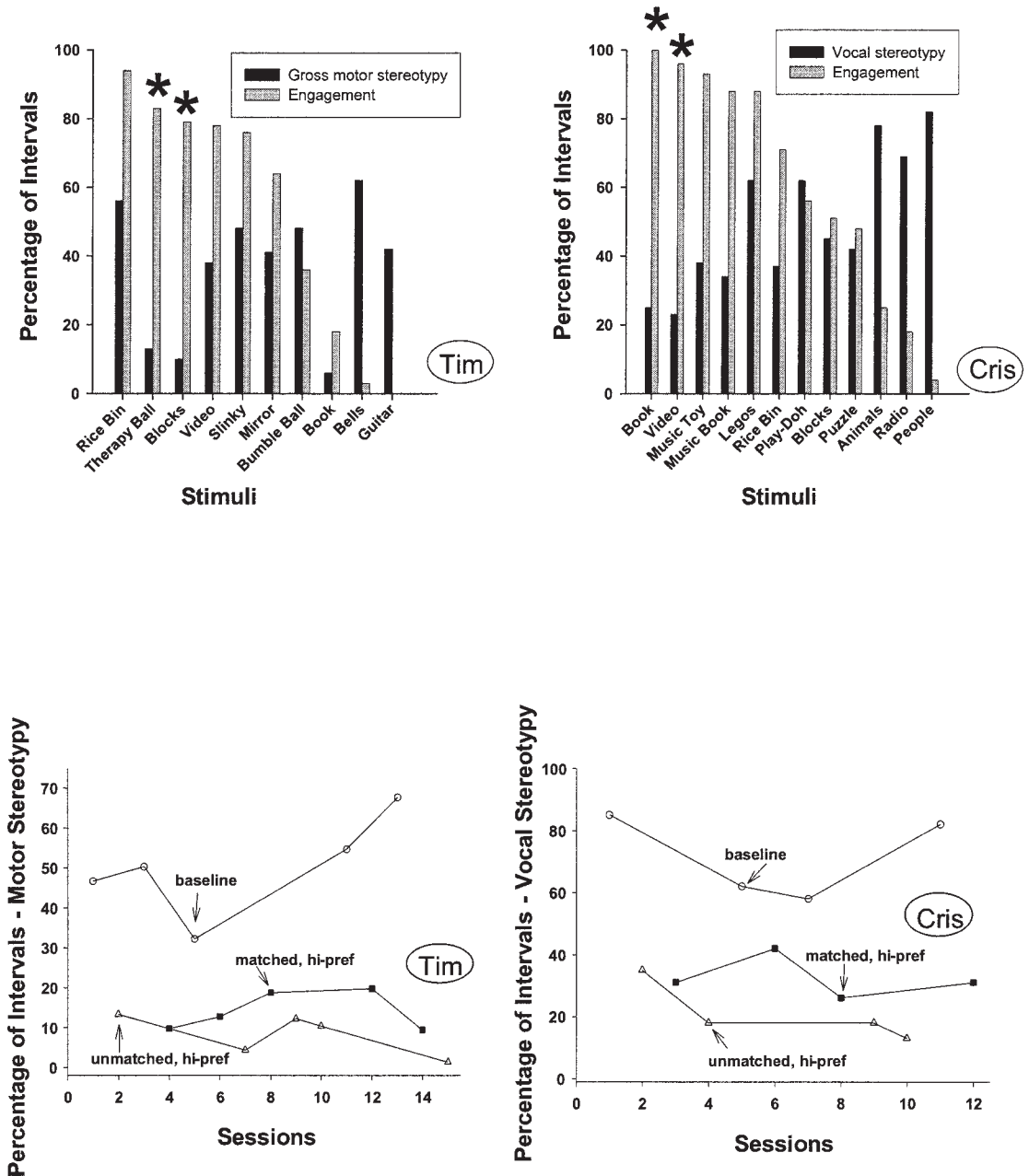


Figure 1. The percentage occurrence of gross motor stereotypy and engagement for Tim (top left) and vocal stereotypy and engagement for Cris (top right) during the duration-based preference assessments. Items used in the subsequent analysis are marked with an asterisk. The percentage occurrence of gross motor stereotypy for Tim (bottom left) and vocal stereotypy for Cris (bottom right) are shown for the multielement comparison.

For Tim, stereotypy occurred in an average of 50% of intervals during baseline (see Figure 1). Significantly lower levels were observed in both the unmatched ( $M = 8\%$ ) and matched ( $M =$

14%) conditions. Engagement averaged 79% (range, 74% to 84%) in the unmatched condition and 77% (range, 73% to 86%) in the matched condition (data not shown). For Cris,

stereotypy averaged 72% of intervals during baseline (see Figure 1). Significantly lower levels were observed in both the unmatched ( $M = 21\%$ ) and matched ( $M = 32.5\%$ ) condition. Engagement averaged 94% (range, 85% to 100%) in the unmatched condition and 92% (range, 85% to 98%) in the matched condition (data not shown). Thus, unmatched stimuli produced lower levels of stereotypy for both participants.

Using methods similar to those employed in the current investigation, Piazza *et al.* (1998, 2000) demonstrated that access to items that matched the sensory consequence thought to maintain automatically reinforced problem behavior effectively competed with its occurrence. Presumably, this outcome is due to the provision of the functional reinforcer through an alternative means (*i.e.*, appropriate item engagement). The present study also found that access to such items produced a substantial decrease in stereotypy. Unlike in previous research, however, both participants exhibited the lowest levels of problem behavior when they were provided with access to the high-preference unmatched items.

The results of Piazza *et al.* (2000) left open the question of whether the deceleration of problem behavior was primarily due to sensory match or preference. The present study indicates that activities that do not provide the same sensory stimulation produced by stereotypy can also displace automatically reinforced behavior. Piazza *et al.* hypothesized that matched items compete with problem behavior by providing stimulation similar to that produced by the problem behavior, thus reducing the presumed motivation to engage in it. By contrast, when unmatched items were presented in the current study, there was no presumed reduction of motivation, yet problem behavior decreased. Thus, it is likely that some individuals obtain a particular form of sensory stimulation through problem behavior due to a general preference or response bias towards that form of sensory

stimulation. Alternatively, preference for other forms of stimulation may be greater than that for the stimulation produced by problem behavior, which might also reduce the occurrence of problem behavior (*e.g.*, Ringdahl, Vollmer, Marcus, & Roane, 1997; Vollmer, Marcus, & LeBlanc, 1994).

Perhaps some individuals with persistent automatically reinforced problem behavior have had limited exposure or access to a variety of activities. Using methods similar to those reported by Piazza *et al.* (1998, 2000) and here, it is possible that a wide variety of activities can be identified that will effectively compete with problem behavior. Ultimately, establishing repertoires of responses that produce varied forms of reinforcement are more desirable than repertoires that produce a single form of stimulation.

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